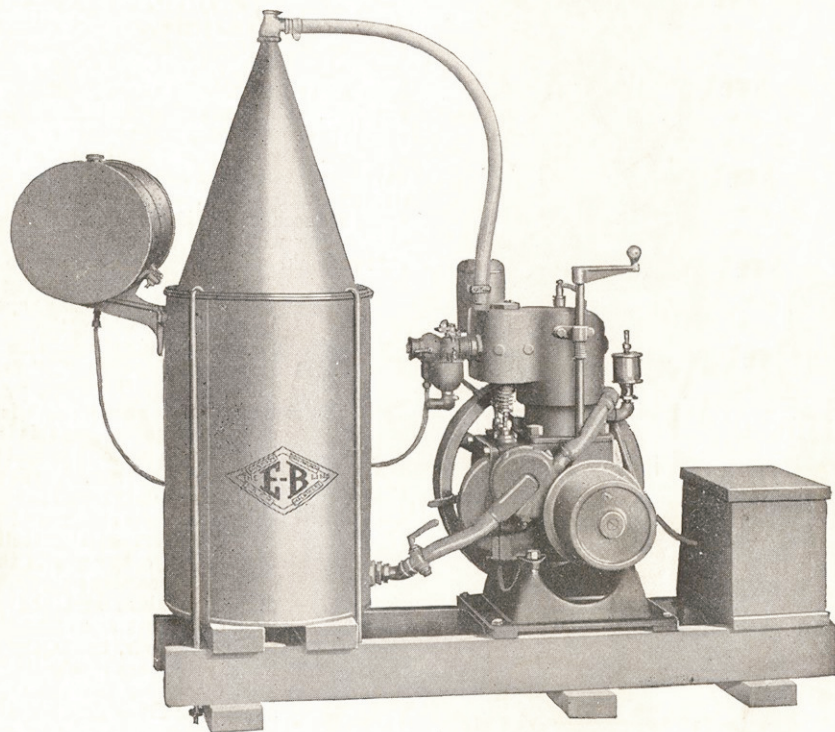


The Line

Type "N" 4 H. P. Gas Engine



Runs Any Machine that can be operated by
4 H. P.—INCLUDING YOUR BINDER

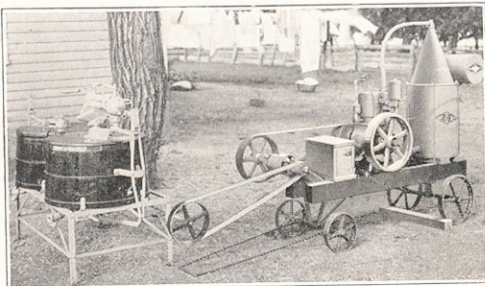
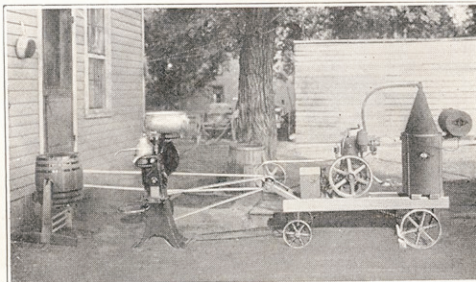
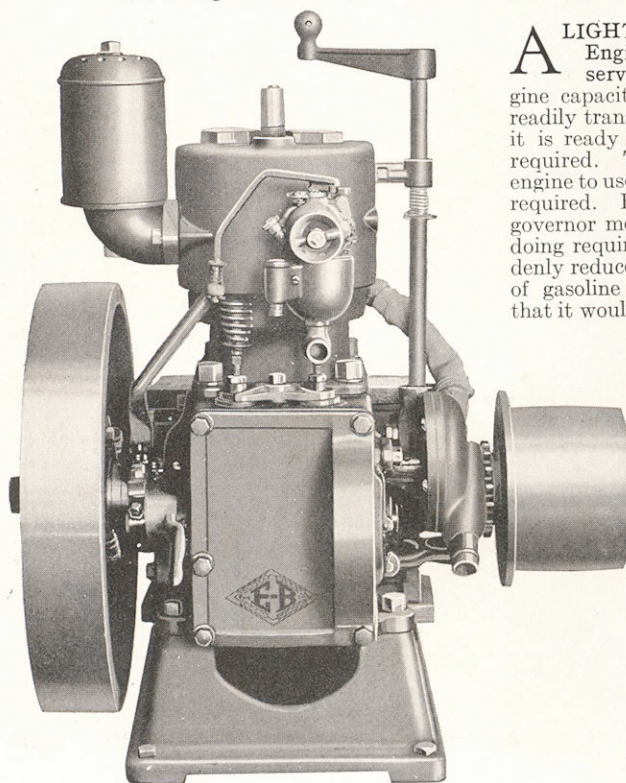
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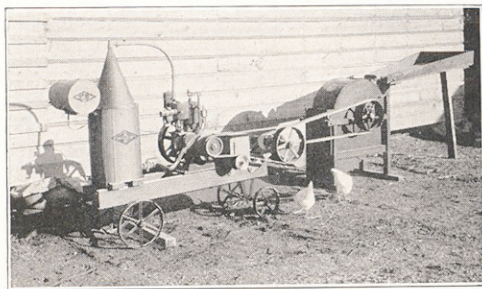
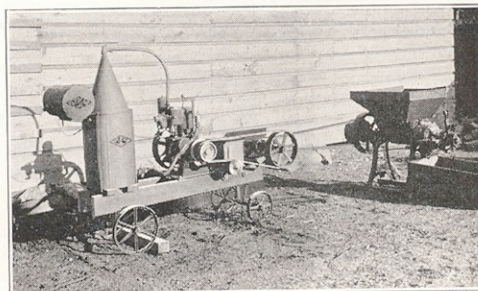
Good Farm Machinery :: Business Founded 1852

ROCKFORD, ILLINOIS

E-B Type "N" 4 H. P. Engine

*It's Doing the Washing**Separating Cream and Churning**It Weighs Only 190 Pounds*

A LIGHT weight simple, compact, all-purpose Engine, manufactured to give universal service and run every machine up to engine capacity. Owing to its light weight, it is readily transported from one job to another, and it is ready instantly to adapt itself to the work required. The throttling governor allows the engine to use only enough gasoline to do the work required. By being equipped with a throttling governor means that should the work that it is doing require 4 H. P. and then the work be suddenly reduced to needing only 2 H. P., the supply of gasoline would be automatically reduced so that it would only use gasoline enough to develop 2 horse power, thus making a great saving in gasoline. The speed may be regulated while the engine is running by simply shifting a short lever. This type "N" engine is built so perfectly, every part being balanced so nicely there is practically no vibration and this is accomplished also with the aid of the throttling governor. Vertical valves of course are used, and as the valves and valve seats are ground perfectly, the valves seat perfectly. By removing a cotter pin in the valve stem and the valve plug from cylinder, the valves and the cage in which they set are instantly "get-at-able." Both, the intake and exhaust valves are mechanically operated by a cam the same principle as used on every automobile.

*Shelling Corn**Grinds the Grain for You*

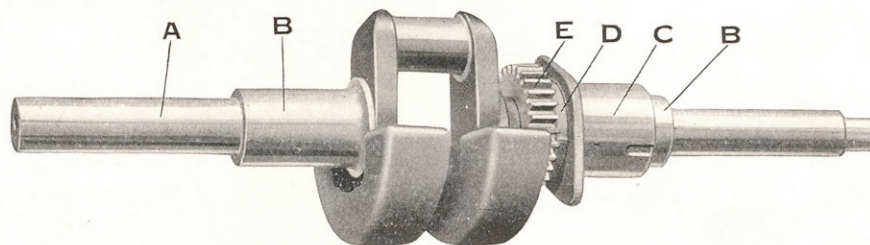


Fig. 1. Forged Steel Perfectly Counterbalanced Crank Shaft.

The crank shaft is of special steel, extra tough and close grained to withstand the constant pound and torsional strain. This shaft is $21\frac{5}{8}$ in. long, $1\frac{3}{8}$ in. diameter, and connecting rod bearing is $1\frac{3}{8}$ in. diameter and full 2 in. wide. This shaft is balanced perfectly by counter weights. These weights are machined to fit the web of the shaft perfectly to prevent turning sidewise and firmly fixed in place by two machine screws, held from loosening by two spring steel washers.

The die cast bearings (B and B, Fig. 1) are made of highest grade babbitt, just hard enough to give the most wear. These bearings are 3 in. long, fitted with a square felt wick running lengthwise in a groove so the entire length of the bearing may always be thoroughly lubricated.

In assembling the crank shaft, the crank shaft pinion "E," which is cut from a billet of steel (no cast iron gears on an E-B Type "N") is keyed on with a standard key, a steel washer is put on, then a fibre washer, followed by the die cast bearing. Over this bearing is placed bushing "C" which slips up to the shoulder of bearing "B."

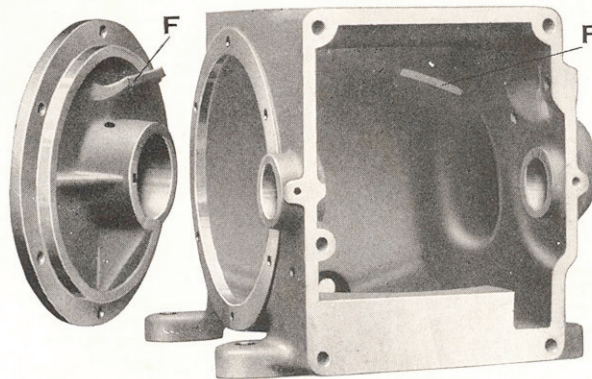


Fig. 2. Crank Case Showing Oil Troughs "F" for Main Bearings.

The shaft is then set in crank case, Figure 2, and main bearing plate, shown at left, securely bolted in place, which makes an oil tight joint.

Above and below the crank shaft bearing in the right hand side of crank case is a set screw with lock nut, this set screw seating on each lug of bushing "C," Fig. 1. Should an end play of crank shaft develop, a slight turn of these two set screws forces the bushing "C" with the bearing "B" up snugly to washers "D."

This is a splendid feature, found exclusively on the E-B Type "N."

The bottom of the crank case, Fig. 2, is hollowed out like the bottom of a tea cup. On the back side of this crank case a small cock is placed just high enough from the bottom so that when it is opened, lubricating oil will run out, if there is sufficient oil in the crank case.

This is called the oil level, and it must be maintained at all times, and will be if the sight feed lubricator is set to drop about ten drops of oil per minute when the engine is running.

E-B Type "N" 4 H. P. Engine

WHY ALL BEARINGS ON TYPE "N" ARE ALWAYS THOROUGHLY LUBRICATED.

When you open the cock directly under the sight feed lubricator, lubricating oil should run out, and if it does not, pour oil into the elbow that the lubricator screws into, until it does. This oil runs past the piston and drops to the bottom of the crank case.

As told above, this bottom is shaped like the bottom of a tea cup, so that even should you run the engine out of perpendicular, the connecting rod cap would dip into the oil.

You will notice on the bottom of the cap on the lower end of the connecting rod, Fig. 3, a nub or spoon. This has a hole in it, and as it dips into the oil, the oil is forced up through this hole and led up through the die cast bearing to lower side of the wrist of crank shaft.

On either side of the connecting rod is a hole that leads to the top die cast bearing, and the oil splashed upon the connecting rod drains to these two holes and runs through to the wrist from the top side.

The nub at bottom of connecting rod dips into the oil 800 times a minute, consequently it splashes oil all over the inside of the crank case.

Two troughs, "F," Fig. 2, with the lower end directly over a hole running from the top of the bearing through the die cast bearing to the crank shaft, pours all the oil that is splashed over the sides into this hole, so that a constant stream of oil is supplied to the felt placed at the top of the die cast main or crank shaft bearings. A hole is drilled at the top of the brass bushings, "J" and "K," Fig. 4, that carry the cam shaft, and this hole lines up with a hole drilled into the crank case that supports the bushings, and a continual splash of oil is thrown over these holes which flows to the bearings of the cam shaft.

The valve lifts, "M," Fig. 4, are sprayed with oil all the time the engine is running.

The sight feed lubricator supplies a constant supply of oil to the piston at the top side, and the splash made by the dip of the connecting rod, sprays the lower side or skirt of piston.

There are no pipes of any kind to get clogged or mashed, and if the oil level is maintained, you may be absolutely sure all moving parts are thoroughly lubricated.

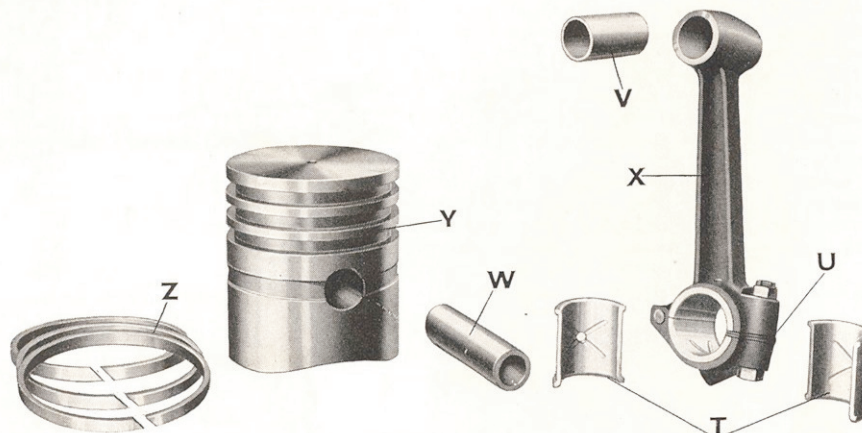


Fig. 3. Forged Steel Connecting Rod and Die Cast Babbet Bearings.

CONNECTING ROD AND PISTON.

The connecting rod, "X," Fig. 3, drop forged out of specially tough steel of I beam section is 9 in. long. The die cast bearings, "T," are 2 in. long, and the lower cap in which one of them seats is hinged with a steel pin at the rear end, while the front end is securely fastened with a steel bolt, nut and cotter. Shims "U" are supplied so wear can easily be taken up by removing them, and it is only necessary to remove inspection plate "P," Fig. 7, to get at these shims.

A brass bushing, "V," $2\frac{1}{8}$ in. long, by $1\frac{1}{4}$ in. in diameter, works over the wrist pin and can be quickly replaced when worn.

The wrist pin, "W," 1 in. in diameter, by 4 in. long, is of hollow steel, case hardened and ground to exact diameter. It is held in place by special steel cotter.

The piston is very light, made of close grained iron from a formula made by our own metallurgist, and the rings also are made from our special mixture, insuring compression and long life.

The piston rings and cylinders are ground and polished to a mirror surface.

Figure 4.

VALVE MECHANISM.

The cam shaft, Fig. 4, is a steel drop forging, and both intake valve cam, "H," and exhaust valve cam, "I," are ground to an exact dimension, and the ends of the shaft are ground to an exact diameter and polished so they fit perfectly the brass bushings, "J" and "K."

The steel gear, "G," meshes with steel pinion, "E," Fig. 1, on the crank shaft at exactly the correct setting.

Fig. 2 shows the two holes at front of crank case into which the brass bushings "J" and "K," Fig. 4, fit, holding the cam shaft rigidly in line. The action of both the intake and exhaust valves is plainly explained by referring to Fig. 4.

"N," Fig. 4, is a long valve lift guide, securely fastened into top of crank case with a yoke. See Fig. 6. "M" is the valve lift which is lifted by the action of cam, "H," and as cam "H" does not strike it directly in the center, causes "M" to revolve slowly, thus reducing wear. "O" is set screw to adjust valves, (should they become worn) securely set with lock nut.

"P" is a long valve guide, securely fastened to bottom of cylinder, and is a guide for valve "Q."

"R" is a plug set directly over the hole through which the valves are removed for cleaning, and is forced into an airtight fit by plug "S."

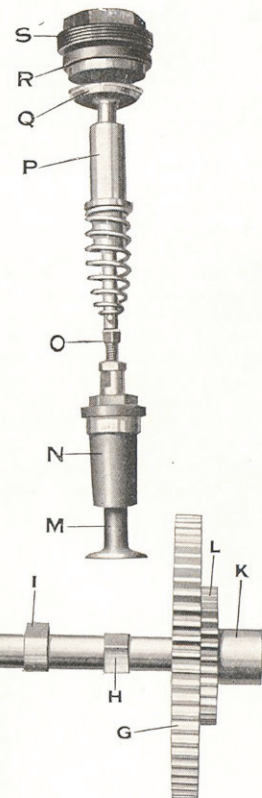


Fig. 4. Cam Shaft and Valve Equipment

Figure 5.

FRICTION CLUTCH PULLEY.

The friction clutch pulley is extremely simple, 100% efficient, and built to give long wear. 1, Fig. 5, is a ball bearing case which fits against a shoulder on the crank shaft, so that all end thrust is directly against these balls. 2, is the sprocket used when engine is attached to binder, and is firmly held to belt pulley 3. 4, is a cone keyed to crank shaft and over which belt pulley 3 engages. The spring 5, compressed and plate 7 riveted to pulley, 3. The stud on cone 4 extends through pulley 3, to ball race, 1.

A lever at the top of the engine, away from any danger to operator, operates this clutch, and the clutch can be thrown in slowly, doing away with any jerk or jar to either machine or engine. An extension rod is furnished with binder attachment, putting the lever handy to operator on binder.

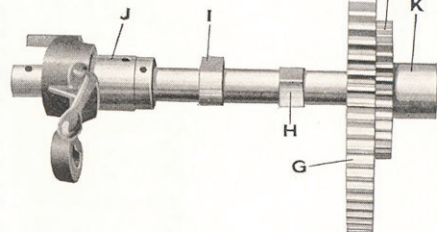


Fig. 5. Complete Friction Clutch Showing Ball Bearing End Thrust.

THE PUMP.

A centrifugal pump run from the gear, "L," Fig. 4, throws $3\frac{1}{2}$ gallons per minute, which circulates around both valves, all around the head, out to the top of the cooling cone, down to the bottom of the cooling tank, and up through the pump again. It makes a continuous circuit of water which prevents overheating.

The spark plug is set directly over the head in the same manner as the primer in a shot gun shell, insuring a fat, hot spark, right where it is needed.

E-B Type "N" 4 H. P. Engine

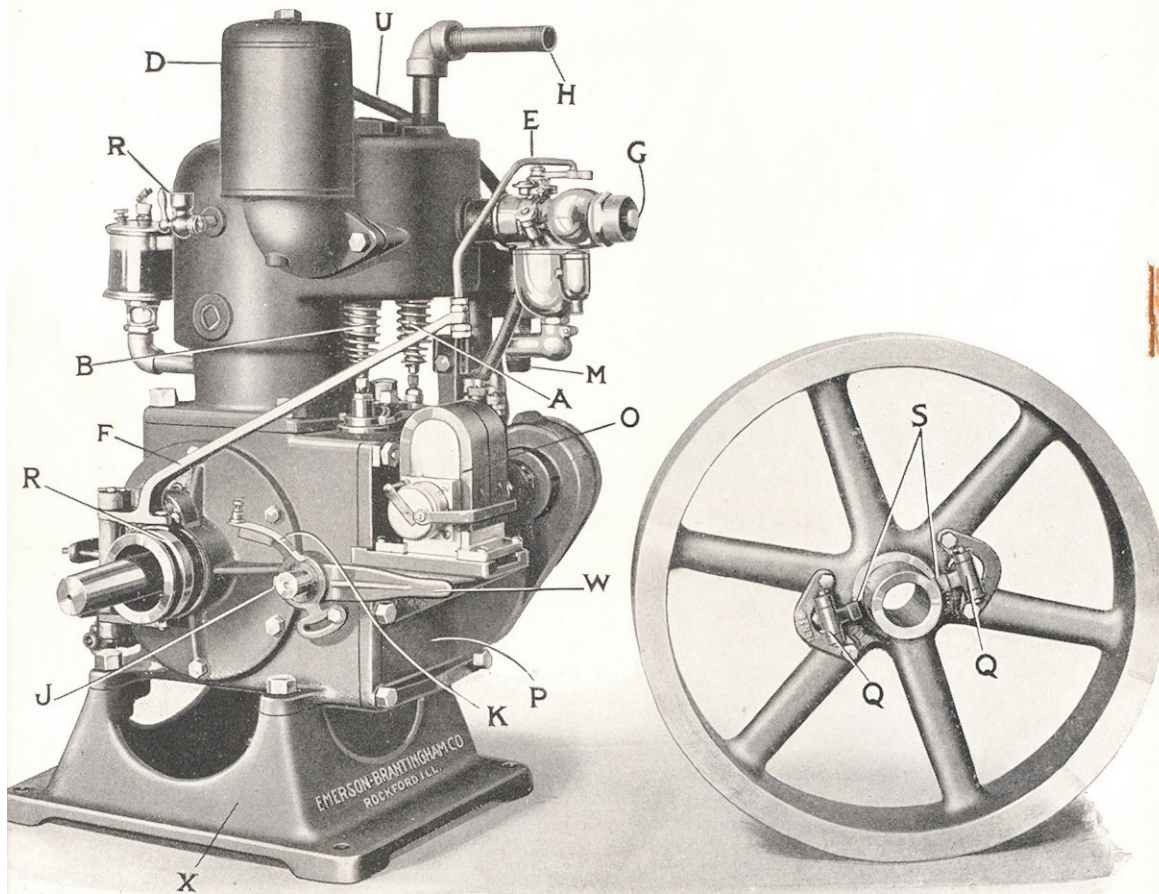


Fig. 7. Type "N" on Sub-base Equipped with Magneto.

A—Valve guide.
B—Valve spring.
D—Muffler.
E—Governor rod.
F—Governor lever.
G—Air damper.

H—Water outlet from engine.
J—Contact screw.
K—Insulated timer spring.
O—Gear driven magneto.
P—Inspection plate.

Q—Governor bracket.
R—Governor spool—Top priming
cup.
S—Works in groove "R"
W—Timer lever.
X—Sub-base.

Should this engine be pulling a load that required only $1\frac{1}{2}$ H. P., the action of the governor would automatically close the carburetor so that only enough fuel would be taken into the cylinder to develop the $1\frac{1}{2}$ Horse Power, and no more.

As the load increased, the governor would automatically open the carburetor so just enough fuel would be taken in to develop the power required. Thus, you have an engine with power varying from $\frac{1}{2}$ H. P. up to 4 H. P., every size using just enough fuel as needed, and supplied automatically.

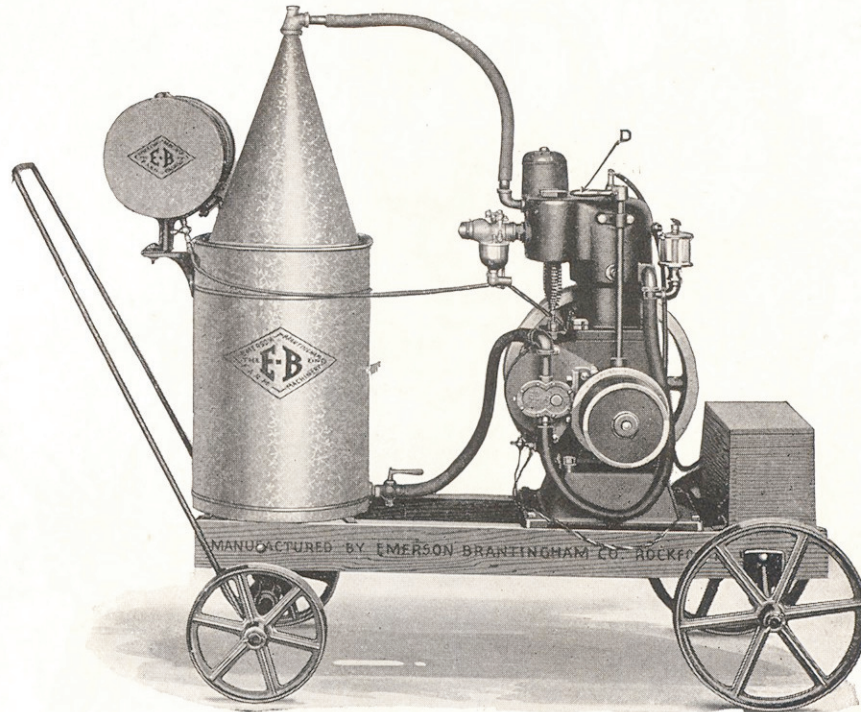
The governor spool, "R," Fig. 7, works on stud of fly wheel and carries two grooves. The slide "S," which is on other end of governor ball, works in the outside groove, and the yoke, to which is attached the governor lever "F," works in the other groove.

As the speed of the fly wheel increases, the governor balls, through centrifugal force, are pulled toward the rim of the fly wheel.

This causes the governor spool, "R," to be drawn toward the fly wheel, which in turn pulls the governor lever "F" over; this pulls governor rod "E," which pulls a short lever on the carburetor that shuts off the supply of fuel.

As the speed is then reduced, a spring connected to governor yoke, pulls the spool "R" back to place, allowing fuel to be fed to the cylinder.

The carburetor, a Schebler, especially designed for the E-B Type "N" Engine is placed directly at the intake valve, so easy starting is assured.



E-B Type "N" on Hand Portable Trucks

Buy the E-B Type "N" Because Its Better

Crank Shaft is a Drop Forging of Best Quality Steel—.

It's better because—It will stand torsional strain.
It is turned to an exact diameter.
It is polished to a mirror surface.
It is equipped with counter weights to make it balance.
It is equipped with quick take up die cast bearings.

Die Cast Bearings Used on Crank Shaft and Connecting Rod.

Are better because—They are made of high grade babbitt and bronze.
They are quickly replaced when worn.
Are made to fit perfectly when renewed.

End Play of Crank Shaft May Be Taken Up.

It's better because—It's easy to do.
A little play soon develops into much play and is very hard on the engine.
The die case bearing is set in the take up block.

Splash Feed Oiling System.

It's better because—Every bearing is thoroughly lubricated.
Bottom of crank case is tea cup shaped so oil level will be maintained even though engine is tipped at an angle.
No oil pipes to become clogged or bent together.
A spray of oil is being thrown over all working parts when engine is running.

E-B Type "N" 4 H. P. Engine

More Reasons Why Its Better

Crank Case Completely Encloses all Working Parts.

It's better because—All dirt and grit is kept out.
It is oil tight.
It is easy to get into to make adjustments.
It is heavy enough to withstand any strain.
It has drain cock to test for oil level.

Connecting Rod Drop Forged I Bar of Steel.

It's better because—It is strongest construction possible.
It can be made lighter and stronger than malleable.
It has bronze bearing at upper end.
It has quick take up die cast bearing at lower end.
It is equipped with oil holes so thorough lubrication is assured.

Cam Shaft of High Carbon Steel.

It's better because—It's large enough to prevent sagging in center.
It has extra long brass bushings at each end.
Both Cams are an integral part of this shaft.
Gears cannot be put on this shaft wrong.

All Bearings are Extra Long and Can Be Renewed When Worn.

Are better because—They will wear longer.
It's easy to put new ones in place.
Cam shaft bearings are brass.

Both Intake and Exhaust Valves are Vertical.

It's better because—There is no wear on valve stems.
Horizontal valves wear stems and allow loss of compression.
Every automobile and truck uses vertical valves.
Vertical valves will seat properly even after long use.

Intake Valve is Mechanically Operated.

It's better because—A cam pushes this valve wide open at just the right time.
A full charge is drawn in the cylinder which insures delivery of horse power required.
This valve does not have to depend on suction to open it.

Piston is Very Light of Special Close Grained Iron.

It's better because—A light piston balances better.
Close grained iron holds all compression.
It's polished like a mirror.

Both Valves are Quickly Accessible and Easily Adjusted.

Are better because—They can be gotten at by removing one nut.
They can be ground or cleaned quickly.
They can be adjusted so easy.

Friction Clutch Pulley Has Ball Bearing End Thrust.

It's better because—Wear is reduced to almost nothing.
Cone type allows machinery to be started slowly.
This pulley is so efficient with so few pieces.

Centrifugal Pump for Circulating Water.

It's better because—It will not clog.
It needs no packing.
It is driven from the half time gear.

It's Manufactured by Emerson-Brantingham Co.

It's better because—Quality is worked right into this organization.
"Do it Right," is the basis on which these engines are built.
If it were possible to build engines better, we would do it.

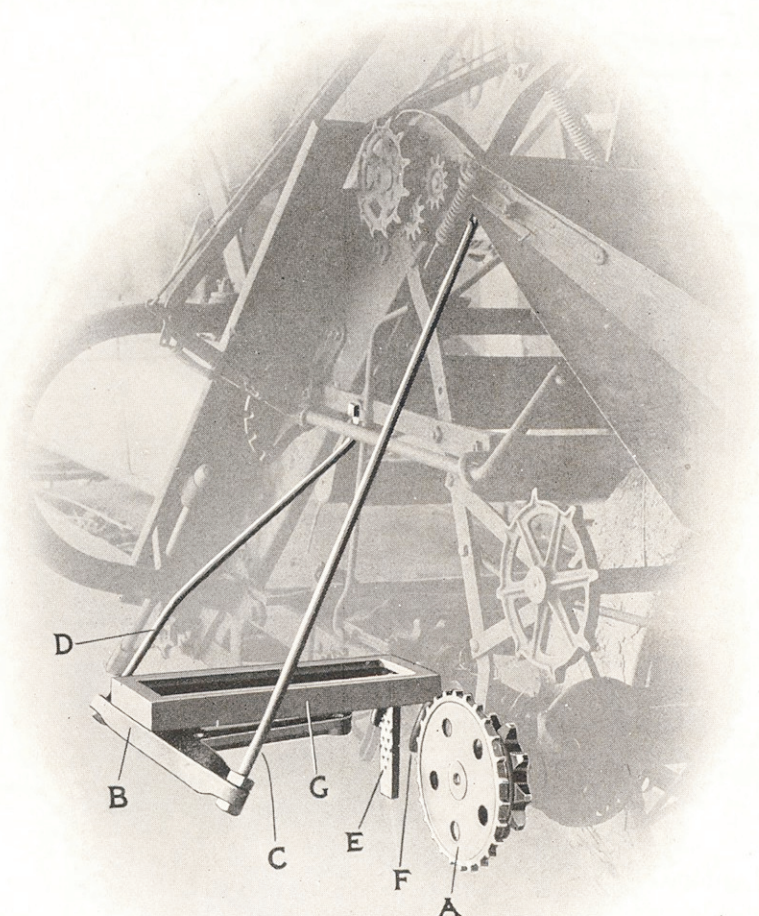


Fig. 8. Showing Double Sprocket

The E-B Type "N," 4 H. P. Engine, when attached to binder, makes a complete unit of the two machines.

The shelf or bracket, "G," is clamped to the rear sill or cross bar of the binder with the U bolts "F." The legs, "E," of the bracket, "G," are corrugated so an up and down adjustment may be made to suit the binder to which it is attached.

The engine less the sub-base is placed on the bracket, "G," and securely bolted to brace "B" with four large bolts.

The braces, "C" and "D," extend from "B" to bolts on binder as shown, and are threaded about six inches to allow for wide range of adjustment.

The double sprocket, "A," takes the place of the sprocket that is attached to the rear end of the pitman fly wheel shaft, and no other change is made in the binder.

This simple attachment becomes a part of the binder, making a solid, rigid shelf, takes only a few minutes to attach, and leaves the parts of the binder as quickly accessible as though it was not put on.

The cooling tank is set on rear end of binder tongue which balances weight of engine.

The Bull chain is removed as the engine does all of the work, the horses simply pulling the binder forward.

E-B Type "N" 4 H. P. Engine

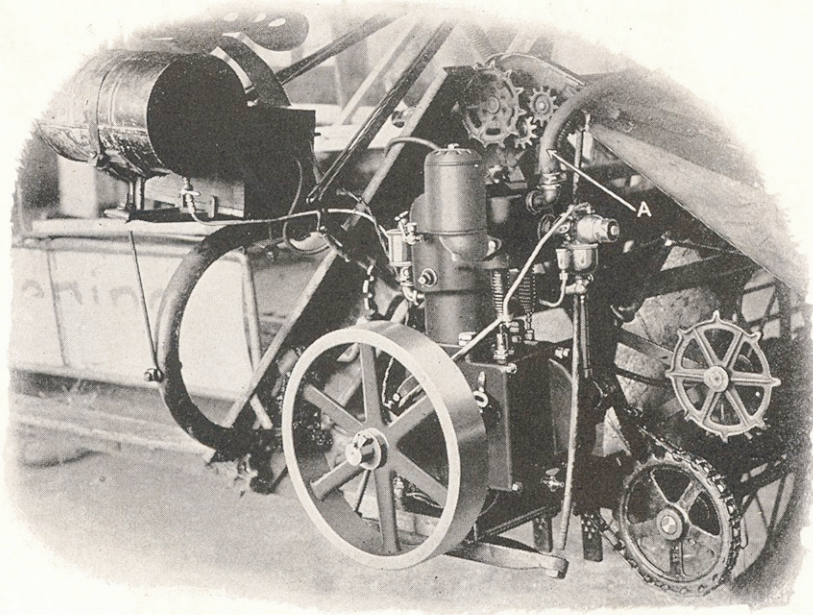


Fig. 9. "A" Shows Hose Leading to Cooling Tank on Tongue.

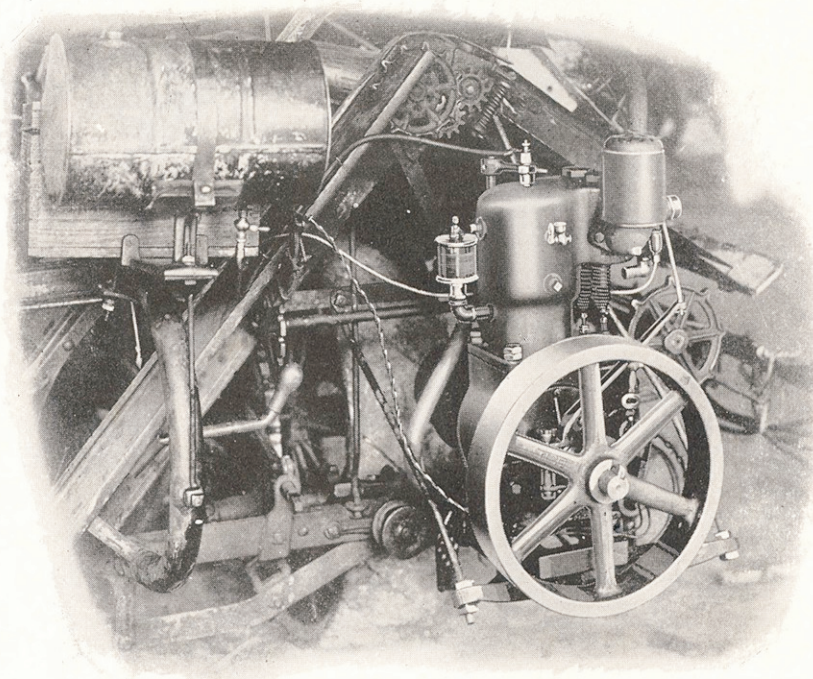
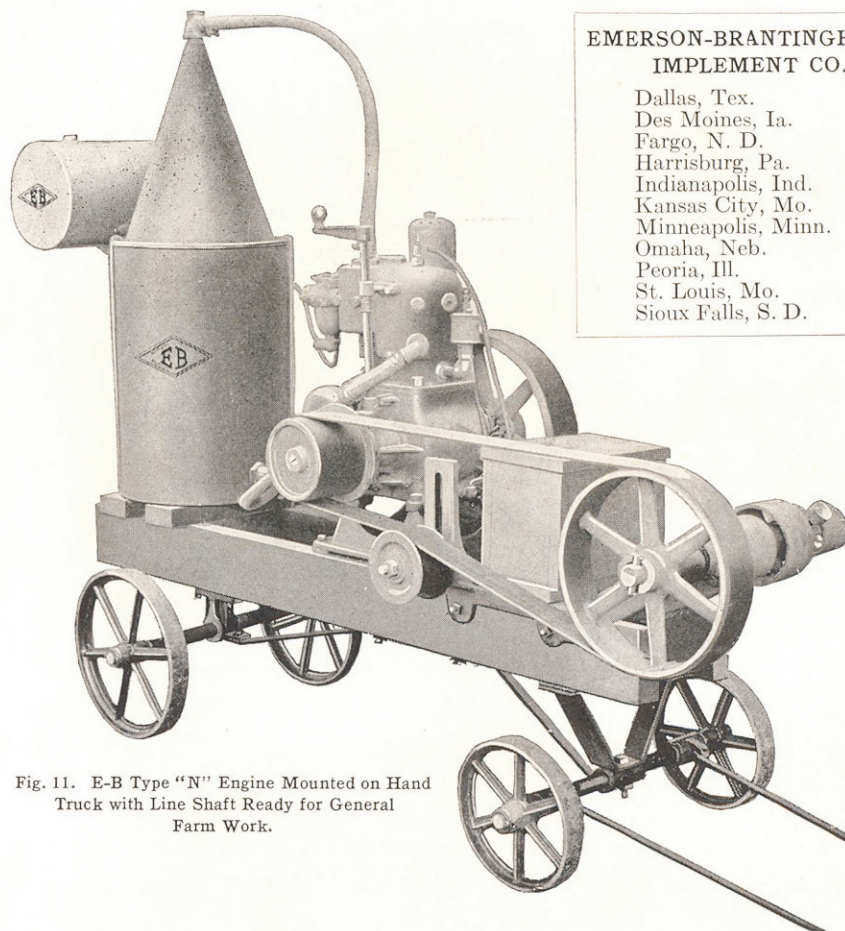


Fig. 10. Showing Engine on Bracket.

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St. Louis, Mo.
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Fig. 11. E-B Type "N" Engine Mounted on Hand Truck with Line Shaft Ready for General Farm Work.

TRUCK AND LINE SHAFT

The engine can be furnished mounted on hand portable trucks as shown on page 7, and may also be fitted with the E-B No. 6 Line Shaft as shown above.

All the pulleys on the line shaft are interchangeable, so the line shaft may be revolved from 400 R. P. M. to 1600 R. P. M., by simply changing the driven pulley.

Four pulleys, 12 in., 8 in., 5 in. and 3 in., with $2\frac{1}{2}$ in. face, are furnished as regular equipment.

With 6 in. regular pulley on engine driving 12 in. pulley, it turns shaft 400 R. P. M., 8 in. pulley, 600 R. P. M., 5 in. pulley, 960 R. P. M., and 3 in. pulley, 1600 R. P. M.

Speed of engine may also be increased or diminished which would also change speed of line shaft. Line shaft complete, furnished at small extra charge.

Engine is shipped complete as shown on page 1, ready to run. Gear driven magneto with impulse starter, trucks, line shaft, or fly wheel, can be furnished at small extra charge.

Specifications E-B Type "N" 4 cycle, 4 H. P. Engine:

Cylinder		Clutch Pulley	R. P. M.	Floor Space	Capacity		Shipping Weight on Skids
Bore	Stroke				Water	Fuel	
$4\frac{1}{4}$	4	6" x 4"	800	22 x 47	12 gal.	$3\frac{1}{2}$ gal.	250

FOR SALE BY
H. LUDWIG
FENTON, St Louis Co., MO.

The "E-B" Line of Farm Machinery has been successfully used by generations of American Farmers. The best of materials and workmanship prove their value in "E-B" machines.

Our Complete Line

Plows	Tedders	Threshers
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	Engine Plows	

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Emerson-Brantingham Implement Company

(Incorporated)

Good Farm Machinery

Established 1852

Rockford, Illinois